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PATENT SPECIFICATION

DRAWINGS ATTACHED



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COMPLETE SPECIFICATION

High-Frequency Ovens

5 We, MULLARD LIMITED, a British Company, of Spencer House, South Place, Finsbury, London, E.C.2, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a high-frequency oven wherein an electro-magnetic field is set up within the oven, articles in the oven being heated by the absorption of energy from this electro-magnetic field.

15 When it is desired to heat a succession of articles in such an oven it would be convenient to pass them through the heating chamber by means of a mechanical conveyor system but this would necessitate passing the conveyed articles through apertures in one or probably two sides of the chamber and this 20 could allow an escape of radio-frequency energy. One of the objects of the present invention is to provide means for sealing such entry and exit apertures against leakage of radio-frequency energy.

25 In a high-frequency oven the distribution of the field is very important for obtaining even heating of articles within the oven. When radio-frequency energy is supplied to the oven a standing wave is formed within the oven, 30 this wave giving rise to a pattern of energy density. The distance between points of maximum density is equal to the distance between points of minimum density and is always larger than half a wave length. When articles 35 are introduced into the oven the field distribution is disturbed since the absorption of energy by the articles causes a damping effect which disturbs the field distribution, the energy maxima and minima being reduced 40 so that a more even field distribution results. However, even heating still cannot be achieved when the heat conductance of the article is low or when a number of articles are in the oven.

45 Hitherto, various arrangements have been

made to attain a more evenly distributed field, such arrangements including rotating field-distributors in the form of slowly rotating vanes and rotating dipoles for coupling RF energy into the oven. Both these methods result in the standing waves in the oven being regularly moved instead of remaining stationary.

50 It is a further object of the present invention to provide a high-frequency oven having means for disturbing the standing waves within the oven.

55 According to the invention a high-frequency oven has an entry port, an exit port, a channel leading to the entry port and having an inner cross-section the same as the entry port, a channel leading from the exit port and having an internal cross-section the same as the exit port, a moving conveyor extending along the entry channel through the oven and along the exit channel, together with a plurality of sealing means spaced along the conveyor the said sealing means being of such shape as to form, 60 in conjunction with the interior of each of said channels, a radio-frequency seal preventing egress of radio-frequency energy from the oven.

65 Preferably the conveyor is provided at spaced intervals with members which affect the radio-frequency field distribution within the oven.

70 In order that the invention may be readily understood embodiments thereof will now be described with reference to the accompanying diagrammatic drawings, wherein:

75 Figure 1 shows a high-frequency oven,

Figure 2 is a part cross-section, and

80 Figure 3 is a part cross-section of a modification.

85 Referring now to Figure 1 a high-frequency oven 1 supplied with radio-frequency energy from a source not shown through a wave-guide 2 the oven is provided with an entry port 3 and an exit port 4 through which ports articles to be treated are passed into and out 90

of the oven. Leading to the entry port is a tunnel 5 having a rectangular configuration of the same size and shape as the entry port 3. The exit port 4 is provided with a similar tunnel 9.

5 The conveyor 6 extends along the entry tunnel, through the oven and along the exit tunnel. Secured to the conveyor at spaced intervals are members 7. Each member 7 comprises a rectangular flanged plate which fits with a small clearance inside the entry and exit tunnels, the clearance between this plate and the walls of each tunnel being such that an effective capacitive coupling is obtained
10 between the plate and the walls of the tunnel, the plate acting as a radio-frequency seal to prevent egress of radio-frequency energy along the tunnel.

15 As the conveyor is moved through the oven the plates 7 disturb the standing wave pattern within the oven so that a stationary wave pattern is avoided.

20 This is shown more clearly in Figure 2 where articles to be sealed are separated by plates 7, each plate acting as a field-disturber as it moves across the oven. The distance between the successive plates 7 must be less than the length of the entry and exit tunnels as seen clearly at the right of Figure 2.

25 Where the articles are large and the distance between adjacent plates 7 is also large, then it is necessary to ensure that the entry and exit tunnels are large enough to embrace successive plates 7, as shown in Figure 3.

30 WHAT WE CLAIM IS:—

35 1. A high-frequency oven having an entry

port, an exit port, a channel leading to the entry port and having an inner cross-section the same as the entry port, a channel leading from the exit port and having an internal cross-section the same as the exit port, a moving conveyor extending along the entry channel through the oven and along the exit channel, together with a plurality of sealing means spaced along the conveyor the said sealing means being of such shape as to form in conjunction with the interior of each of said channels, a radio-frequency seal preventing egress of radio-frequency energy from the oven.

2. An oven as claimed in Claim 1 wherein the conveyor is provided at spaced intervals with members which affect the radio-frequency field distribution within the oven.

3. An oven as claimed in Claim 2 wherein the said members which affect the radio-frequency field distribution are comprised by the said sealing means.

4. An oven as claimed in any preceding claim wherein each sealing means comprises a rectangular plate.

5. A high-frequency oven substantially as herein described with reference to Figures 1 and 2 or Figures 1 and 3 of the accompanying drawings.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale.*

FIG. 1.

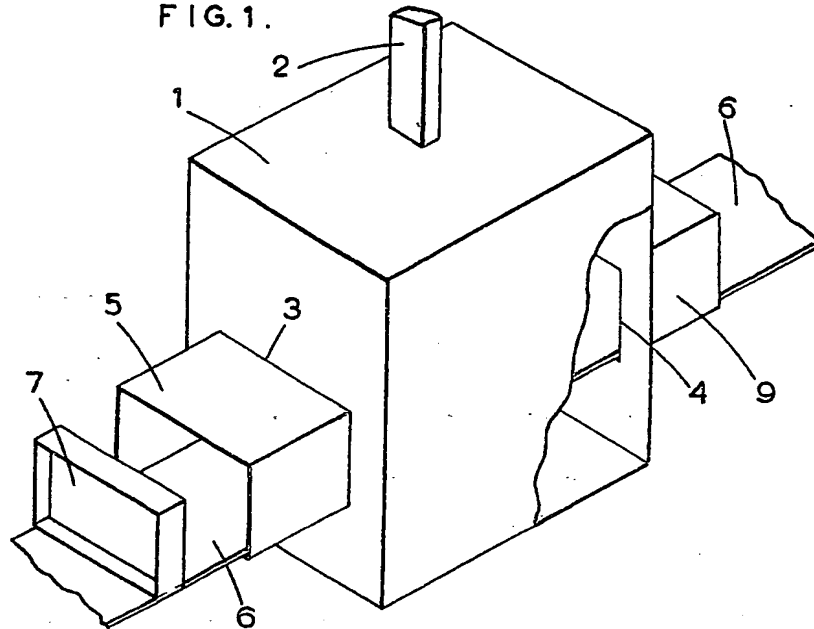


FIG. 2.

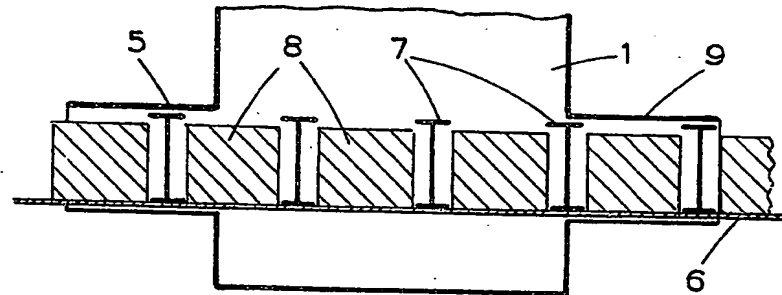


FIG. 3.

